1. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-3x - 16} \text{ and } g(x) = 3x^3 + 9x$$

A. The domain is all Real numbers except $x = a$, where $a \in [4.2, 12.2]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-7.33, 0.67]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [5.33, 11.33]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [5.67, 8.67]$ and $b \in [4.6, 12.6]$

E. The domain is all Real numbers.

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2. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = \ln(x - 5) - 2$$

A. $f^{-1}(7) \in [153.41, 157.41]$

B. $f^{-1}(7) \in [8107.08, 8112.08]$

C. $f^{-1}(7) \in [2.39, 7.39]$

D. $f^{-1}(7) \in [8096.08, 8099.08]$

E. $f^{-1}(7) \in [162748.79, 162755.79]$

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3. Determine whether the function below is 1-1.

$$f(x) = 25x^2 + 220x + 484$$

A. Yes, the function is 1-1.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. No, because there is an x-value that goes to 2 different y-values.

D. No, because there is a y-value that goes to 2 different x-values.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = e^{x+5} - 3$$

A. $f^{-1}(10) \in [-1.1, -0.84]$

B. $f^{-1}(10) \in [7.32, 8.32]$

C. $f^{-1}(10) \in [-0.32, 0.71]$

D. $f^{-1}(10) \in [-2.55, -1.81]$

E. $f^{-1}(10) \in [-2.19, -1.3]$

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5. Determine whether the function below is 1-1.

$$f(x) = (5x + 17)^3$$

A. No, because the range of the function is not $(-\infty, \infty)$.

B. Yes, the function is 1-1.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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6. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -4x^3 - 2x^2 + 4x \text{ and } g(x) = -3x^3 - 4x^2 - x - 3$$

A. $(f \circ g)(-1) \in [10, 23]$

B. $(f \circ g)(-1) \in [83, 91]$

C. $(f \circ g)(-1) \in [75, 84]$

D. $(f \circ g)(-1) \in [3, 15]$

E. It is not possible to compose the two functions.

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7. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 + 2x^2 - 3x \text{ and } g(x) = -4x^3 + x^2 + 2x - 3$$

A. $(f \circ g)(1) \in [-9, -3]$

B. $(f \circ g)(1) \in [1, 4]$

C. $(f \circ g)(1) \in [-84, -83]$

D. $(f \circ g)(1) \in [-76, -73]$

E. It is not possible to compose the two functions.

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8. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -10$ and choose the interval that $f^-1(-10)$ belongs to.

$$f(x) = \sqrt[3]{4x - 3}$$

A. $f^{-1}(-10) \in [-250, -247]$

B. $f^{-1}(-10) \in [246.4, 250.6]$

C. $f^{-1}(-10) \in [249.9, 253]$

D. $f^{-1}(-10) \in [-250.9, -249.9]$

E. The function is not invertible for all Real numbers.

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9. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = 5x^2 - 2$$

A. $f^{-1}(-15) \in [5.33, 5.75]$

B. $f^{-1}(-15) \in [1.81, 2.05]$

C. $f^{-1}(-15) \in [1.48, 1.65]$

D. $f^{-1}(-15) \in [4.33, 4.91]$

E. The function is not invertible for all Real numbers.

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10. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 9x^2 + 8x + 6 \text{ and } g(x) = 5x^3 + 8x^2 + 5x + 6$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.5, 5.5]$

B. The domain is all Real numbers except $x = a$, where $a \in [6.2, 7.2]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [2.67, 9.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7.33, 1.67]$ and $b \in [-5.25, -2.25]$

E. The domain is all Real numbers.
